SOV-120-58-1-3/43

AUTHOR: Timushev, G. F.

TITLE: A Magnetic Analyser for Studying Nuclear Reactions (Magnitnyy analizator dlya issledovaniya yadernykh reaktsiy)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 1, pp 22-30 (USSR)

ABSTRACT: A brief description of the theory and construction of a magnetic analyser with double focussing and semicircular pole pieces is given. The main parameters of the analyser are as follows: mean radius of pole pieces, 50 cm, relative solid angle 3.1×10^{-4}, maximum field in the gap, 12 kilo-oersted, resolution 0.1%, the size of the source and the detecting slit being 1×30 mm^2. The total weight of the analyser is 4 tons. The field distribution in the gap along a given radius is shown in Fig.6 for different currents. The focussing properties and linearity of the detector (ionisation chambers and electron multipliers) were checked, using a Po source. The α-particle peaks obtained from the Po source under different conditions are shown in Figs.7 and 8.

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SOV-120-58-1-3/43

A Magnetic Analyser for Studying Nuclear Reactions.

The following persons are thanked: S, S. Vasil'yev, Z. F. Kalacheva, I. D. Kokon', Ye. G. Komar, N. S., Strel'tsova and M. A. Gasheva. There are 8 figures, no tables and 8 references, of which 4 are English, 2 German and the rest Soviet.

ASSOCIATION: 2-y nauchno-issledovatel'skiy fizicheskiy institut MGU (2nd Scientific Research Institute of Physics of the Moscow State University)

SUBMITTED: May 15, 1957.

1. Nuclear reactions--Analysis 2. Analyzers--Theory 3. Analyzers --Equipment 4. Analyzers--Performance

Card 2/2

AUTHORS: Romanovskiy, Ye. A., Timushev, G. F. SOV/56-34-5-58/61

TITLE: Non-Elastic Scattering Cross Sections of 4,5 MeV Deuterons of Some Light Nuclei (Poperechnyye secheniya neuprugogo rasseyaniya deytronov s energiyey 4,5 MeV na nekotorykh legkikh yadrakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 5, pp. 1350 - 1351 (USSR)

ABSTRACT: In this paper the differential cross sections of the non-elastic scattering of deuterons with $E_d \sim 4$ to 4,5 MeV at nuclei of Li^7, Fe^{19}, Na^{23}, Mg^{24} and of Al^{27} were measured. The groups of the non-elastically scattered deuterons were separated by a magnetic analyzer with double focusing. The deuterons were accelerated by the 72-cm cyclotron of the Institute of Nuclear Physics at the Moscow State University (Moskovskiy gosudarstvennyy universitet). The values of the differential cross sections for $E_d = 4,5$ MeV and for the scattering angle (in the laboratory system) $\vartheta_{labor.} = 91^\circ$ are given in a table. This table also contains the values of the differential cross sections $d\sigma_{F_2}/d$ and of

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the total cross sections σ_{E_2} of the Coulomb (Kulon) excitation of the levels in the nuclei F^{19}, Na^{23} and Mg^{24}. These cross sections were computed by means of the formulae by A.Alder et al.(Ref 9). The results compiled in this table tend to show the following: At E_d=4,5 MeV the contribution of σ_{E_2} to the experimental value of σ_{total} amounts to a few %. Therefore at $E_d \sim 4$ to 4,5 MeV and above the excitation of the nuclei by the Coulomb field of the approaching deuterons cannot be the predominant process which leads to a non-elastic scattering of the deuterons. This conclusion disagrees with the theory of the (d,d')-reaction which was developed by C.Mullin (Mellin) and E.Guth (Gut). There are 1 table and 11 references, 2 of which are Soviet.

Non-Elastic Scattering Cross Sections of 4,5 MeV Deuterons of Some Light Nuclei

307/56-34-5-58/61

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: February 24, 1956

1. Deuterons--Scattering 2. Cyclotrons--Applications 3. Deuteron cross sections 4. Nuclei--Excitation

Card 3/3

TIMUSHEV, G. F.: Master Phys-Math Sci (diss) -- "Magnetic analysis of nonelastic diffuse deuterons". Moscow, 1959. 10 pp (Min Higher Educ USSR, Moscow Order of Lenin and Order of Labor Red Banner State U im M. V. Lomonosov, Sci Res Inst of Nuclear Phys), 100 copies (KL, No 12, 1959, 125)

SOV/120-59-2-50/50

AUTHORS: Timushev, G.F., and Kokon', I.D.

TITLE: A Remote Control Magnetic Field Meter (Distantsionnyy izmeritel' magnitnogo polya)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 2, p 154, (USSR)

ABSTRACT: When magnetic analysers are used in nuclear reaction studies, it is necessary to measure continuously the magnetic field. The corresponding magnetic field meter must, for safety reasons, be operated by remote control. Such a meter is shown in Fig 1. A similar instrument was described in Ref 1. The instrument consists essentially of a small frame 0.8 x 1.2 cm2 in size and carrying 100 turns of 0.05 - 0.1 mm diameter wire. The frame is suspended in the magnetic field on nylon threads. The relative magnitude of the magnetic field is determined by measuring the current through the coil necessary to balance the couple due to a spiral spring one end of which is attached to the frame. For remote operation and inspection, closed circuit television is used. The position of the frame is determined by means of light reflected from a mirror attached to the

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SOV/120-59-2-50/50

A Remote Control Magnetic Field Meter

frame. The accuracy of the instrument is better than 0.01%. To exclude random errors two such instruments are used at the same time.

Card 2/2 There are 1 figure and 1 Soviet reference.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU
(Scientific Research Institute for Nuclear Physics, Moscow State University)

SUBMITTED: June 28, 1958

GRANCHA, I.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.; KHASANI, M.M.

Polarization of protons scattering on carbon. Vest. Mosk. un. Ser. 3: Fiz., astron. 19 no.4:87 Jl-Ag '64.
(MIRA 17:10)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo universiteta.

ASFUR, F.; GRANCHA, I.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.; KHASANI, M.

Measuring the angular distribution for the reaction $Al^{27}(p,)Mg^{24}$ by means of a magnetic analyzer at E_p = 6.6 Mev. Vest. Mosk. un. Ser.3:Fiz., astron. 19 no.1:21-22 Ja-F '64. (MIRA 17:4)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo universiteta.

VASIL'YEV, S. S.; ROMANOVSKIY, Ye. A.; TIMUSHEV, G. F.

Properties of the lower excited states of F^{19} and Al^{27} nuclei determined from data on inelastic proton scattering. Izv. AN SSSR. Ser. fiz. 16 no.12:1508-1517 D '62. (MIRA 16:1)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova.

(Fluorine) (Aluminum) (Protons—Scattering)

GRAMOVA, I.; ROMANOVSKIY, Ye. A.; TIMUSHEV, G. F.

"Investigation of the Scattering of Protons by Li Nuclei."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

Moscow State Univ.

ASFUR, F.; GRANCHA, I.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.; KHASANI, M.M.

Measurement of the polarization of CE_p = 6.6 Mev. protons scattered on aluminum. Vest. Mosk. un. Ser. 3:Fiz., astron. 18 no.5:8-10 S-O '63. (MIRA 16:10)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

GRANCHA, I.; ROMANOVSKIY, Ye. A.; TIMUSHEV, G. F.; KHASANI, M. M.

"Polarizations of Protons with Energies 6.6 MeV in the Case of Elastic and Inelastic Scattering on Some Light Nuclei."

report sumitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

Moscow State Univ.

ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.

Studying nuclear reactions with the aid of a magnetic analyzer. Vest. Mosk. un. Ser. 3: Fiz., astron. 18 no.4:56-61 Jl-Ag '63. (MIRA 16:8)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Nuclear reactions) (Magnetic instruments)

GRANCHA, I.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.; KHASANI, M.M.

Efficient polarimeters for low and medium energy protons operated in combination with magnetic analyzers. Vest. Mosk. un. Ser. 3: Fiz., astron. 18 no.4:62-67 Jl-Ag '63. (MIRA 16:8)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Polariscope) (Magnetic instruments)

S/903/62/000/000/018/044
B102/B234

AUTHORS: Vasil'yev, S. S., Romanovskiy, Ye. A., Timushev, G. F.

TITLE: Problem of the inelastic scattering mechanism of slow protons from Al^{27}

SOURCE: Yadernyye reaktsii pri malykh i srednikh energiyakh; trudy Vtoroy Vsesoyuznoy konferentsii, iyul' 1960 g. Ed. by A. S. Davydov and others. Moscow, Izd-vo AN SSSR, 1962, 201-206

TEXT: In order to find out whether direct processes play the main role even at low proton energies and whether the anisotropy observed in the angular distributions is due to compound nucleus formation of a with several levels excited, or whether it may be also explained by a direct mechanism, the inelastic scattering of 6.6-Mev protons from Al^{27} was investigated. In the Al^{27}+p reaction, Si^{28} is formed with an excitation energy of ~18 Mev. If the level density of the compound nucleus is assumed to be $\sim\exp(2\sqrt{\beta E_{exc}})$, then for E_{exc} ~18 Mev the level distance will be 4 - 6 kev. Then, in the

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Problem of the inelastic...

case of an energy spread of the protons effecting overlap of a great number of levels, the quantum characteristics is random and the proton angular distribution in the case of Si^{28} formation will be isotropic. In the case of direct processes no strong dependence of σ on Θ may be expected. A double-focusing magnetic analyzer was used for measuring the angular distributions in the interval 30-150° of six proton groups scattered from Al^{27} with excitation of the levels 0.840, 1014, 2.216, 2.743, and 3.000 Mev. The protons were accelerated in the 120-cm cyclotron of the NIIYaF MGU, their energy spread was 45 kev, the target thickness 20 kev. The differential elastic scattering cross sections were determined by way of comparison with those of Au^{197} and the compound nucleus formation cross section was estimated from the relation $\sigma_c \simeq \pi(R_o+\lambda\!\!\!^{-})^2(1-V/E_p)$ where $R_o = 1.4A^{1/2}$ Fermi, $\lambda\!\!\!^{-}$ is the reduced proton wavelength. With $V = Ze^2/(R_o+\lambda\!\!\!^{-})$ this yields $\sigma_c \sim 600$ mb. A comparison of the results indicates that the asymmetry observed may be explained by the contribution of direct processes to scattering and an experimental-theoretical comparison on the basis of the direct-

Card 2/3

Problem of the inelastic...

interaction relation $d\sigma/d\Omega \sim |j_l(|\vec{k}_i - \vec{k}_f|R_o)^2$ verifies this conclusion. j_l is a spherical Bessel function of l-th order, $\vec{k}_i$, $\vec{k}_f$ are the wave vectors of incident and scattered proton, and R_o the interaction radius. There are 5 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki, MGU im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics, MGU imeni M. V. Lomonosov)

Card 3/3

VASIL'YEV, S.S.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.

Cross sections of the capture of 6.6 Mev. protons by Cu^{63} and Cu^{65} nuclei. Vest. Mosk. un. Ser.3: Fiz., astron. 17 no.1:94-95 Ja-F '62. (MIRA 15:2)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta im. M.V.Lomonosova.
(Protons) (Copper--Isotopes)

S/048/62/026/012/012/016
B117/B102

AUTHORS: Vasil'yev, S. S., Romanovskiy, Ye. A., and Timushev, G. F.

TITLE: Properties of the lower excited states of F^{19} and Al^{27} nuclei inferred from data on inelastic proton scattering

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 12, 1962, 1508 - 1517

TEXT: Predictions as to the possibilities for obtaining information on nuclear states by investigating inelastic nucleon scattering are here re-examined experimentally in the light of recent model conceptions of direct inelastic interactions between elementary particles. For this purpose protons were accelerated to 6.6 Mev in the 120-cm cyclotron of the NIIYaF MGU and their inelastic scattering on F and Al nuclei was investigated. By evaluating the proton energy spectra recorded at 8 to 9 different angles (from 30 to 150°) information could be obtained on the energy levels of the nuclei investigated. Comparison with results of other authors showed that the level positions can be determined with great accuracy by using targets thick enough to ensure a big enough yield of inelastically

scattered particles. This paper was presented on the 12th Annual Conference on Nuclear Spectroscopy in Leningrad from January 26 to February 2, 1962. There are 1 figure, 1 table, and 46 references.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of the Moscow State University imeni M. V. Lomonosov)

S/188/62/000/004/010/010
B108/B102

AUTHORS: Vasil'yev, S. S., Romanovskiy, Ye. A., Timushev, G. F.

TITLE: Cross section of 6.6-Mev proton absorption by F^{19} nuclei

PERIODICAL: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 4, 1962, 93

TEXT: In order to collect evidence for the hypothesis of surface absorption of low and medium-energy nucleons by nuclei (Bjorklund F. E., Fernbach S. Phys. Rev., 10, 1295, 1958) the authors studied the collision of 6.6-Mev protons with F^{19} nuclei. Such collisions involve several processes: elastic and inelastic scattering, (p,n), (p,α), and (p,γ). Nine levels with energies between 0.110 and 4.036 Mev are excited by such processes. The total cross section of inelastic scattering of 6.6-Mev protons from F^{19} nuclei as found from the level excitation cross sections is approximately 450 mb. Data on the cross sections of the other processes were taken from publications. The total absorption cross section is

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Cross section of 6.6-Mev...

$$\sigma_r = \sigma_{p,p'}(450 \text{ mb}) + \sigma_{pp}(20 \text{ mb}) + \sigma_{p\alpha}(10 \text{ mb}) + \sigma_{pn}(55 \text{ mb}).$$

As the accuracy of the (p,n) and (p,p) reaction cross sections is not known it is difficult to estimate the error in the total absorption cross section. The exact value of σ_r will certainly be between 500 and 550 mb.

ASSOCIATION: NIIYaF

SUBMITTED: March 14, 1962

40869

S/048/62/026/009/004/011
B125/B186

24.6600

AUTHORS: Vasil'yev, S. S., Romanovskiy, Ye. A., and Timushev, G. F.

TITLE: Inelastic scattering of 6.6-Mev protons from nickel and copper nuclei

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 9, 1962, 1143-1149

TEXT: The inelastic scattering of 6.6-Mev protons from Ni^{58}, Ni^{60}, Cu^{63} and Cu^{65} nuclei is studied in detail. The proton beam from the 120-cm cyclotron of the NIIfaF MGU was focused into the reaction chamber by quadrupole lenses. The protons from nickel and copper foils with natural isotopic composition scattered through an angle ϑ were analyzed with a double-focusing magnetic spectrometer. The energies of the excited states as measured (Table 1) are in good agreement with the results of C. H. Paris, W. W. Buechner, Bull. Amer. Soc., Ser. II, 2, 61 (1957) and of M. Nazari et al., Phys. Rev., 108, 373 (1957). The inelastic proton scattering occurs probably via compound nucleus formation because the angular distributions of the scattered protons are isotropic within the limits of

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Inelastic scattering of 6.6-Mev ...

measurement error.

$$\sigma=\frac{1}{2}\pi\lambda^2\left\{T_0\left[\frac{2(2T_2')}{T_0+2T_2'}\right]+T_1\left[\frac{2(T_1'+T_3')}{T_1+T_1'+T_3'}+\frac{4(2T_1'+2T_3')}{T_1+2T_1'+2T_3'}\right]+\right.$$
$$+T_2\left[\frac{10(T_0'+2T_2')}{T_2+T_0'+2T_2'}\right]+T_3\left[\frac{6(2T_1'+2T_3')}{T_3+2T_1'+2T_3'}+\frac{8(T_1'+2T_3')}{T_3+T_1'+2T_3'}\right]+ \quad (6)$$
$$\left.+T_4\left[\frac{8(2T_2')}{T_4+2T_2'}+\frac{10T_2'}{T_4+T_2'}\right]\right\}.$$

is the total inelastic scattering cross section of protons (E_p=6.6Mev) from Li^{60}. The "penetrabilities" T_L and $T_{L'}$ are equal to zero if $T>4$, and $T'>3$. L and L' are the orbital angular momenta of the incident and of the outgoing proton. The contribution of the direct processes to the scattering here considered is negligibly small. Table 2 gives the total

Card 2/4

Inelastic scattering of 6.6-Mev ...

cross sections of the proton scattering from Cu^{63} and Cu^{65} with E_p=6.6Mev. The sum of the total cross sections of inelastic scattering in the range up to 5.5 Mev is 230±20 millibarn for Ni^{58} and 250±30 millibarn for Ni^{60}. For this reason the fraction of the pp-processes that occurs via a compound nucleus formation may be 300 to 350 millibarn in the scattering of protons from Ni^{58} and Ni^{60} at E_p = 6.6 Mev. The present results do not contradict the hypothesis of increased elastic scattering cross section of even-even Ni^{58} and Ni^{60} nuclei through large angles due to the great contribution of the pp-processes taking place via a compound nucleus. There are 6 figures and 2 tables.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of the Moscow State University imeni M. V. Lomonosov)

S/048/62/026/009/004/011
B125/B186

Inelastic scattering of 6.6-Mev ...

Table 1. Energies of the excited states in Ni^{58}, Ni^{60}, Cu^{63}, and Cu^{65} (in Mev).

Ni^{58}	Cu^{63}	Cu^{65}
1,450±0,006	0,657±0,007	0,777±0,008
2,457±0,012	0,956±0,008	1,108±0,008
2,772±0,012	1,328±0,015	1,480±0,010
2,892±0,012	1,419±0,015	1,635±0,015
2,941±0,012	1,544±0,015	1,730±0,015
3,030±0,012	1,856±0,015	2,099±0,015

Legend to Table 2: (1) process; (2) σ_{total}

(1) Процесс	σ, мб	
	Cu^{63}	Cu^{65}
(p, p')	240±30	70±15
(p, α)	35± 3	37±10
(p, n)	300±30	500±50
(p, p)	~25	~10
(2) $\sigma_{прим}$	600±50	617±50

Card 4/4

VASIL'YEV, S.S.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.

Lower excited states of Ca^{40}. Vest. Mosk. un. Ser. 3: Fiz., astron. 16 no.6:88-89 N-D '61. (MIRA 14:12)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Quantum theory)
(Calcium)

VASIL'YEV, S.S.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.

Collective excited states in Mn^{55}. Vest. Mosk. un. Ser. 3: Fiz., astron. 16 no.6:89-90 N-D '61. (MIRA 14:12)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Quantum theory)
(Manganese)

VASIL'YEV, S.S.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.

Inelastic scattering of 6.6 Mev. protons on Ca^{40} and Mn^{55} nuclei [with summary in English]. Zhur. eksp. i teor. fiz. 42 no.2:395-402 F '62. (MIRA 15:2)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Protons—Scattering)(Calcium)(Manganese)

VASIL'YEV, S.S.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.

Inelastic proton scattering on F^{19} nuclei. Zhur.eksp.i teor.fiz. 41 no.4:1040-1042 O '61. (MIRA 14:10)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Protons—Scattering)

VASIL'YEV, S.S.; ROMANOVSKIY, Ye.A.; TIMUSHEV, G.F.

Measuring the angular distribution for the Al^{27} (p, p')Al^{27*} reaction with the aid of a magnetic analyzer when E_p = 6.6 Mev. Zhur.eksp.i teor.fiz. 40 no.3:972-973 Mr '61. (MIRA 14:8)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Nuclear reactions) (Magnetic measurements)
(Aluminum--Isotopes)

S/056/62/042/002/015/055
B102/B138

AUTHORS: Vasil'yev, S. S., Romanovskiy, Ye. A., Timushev, G. F.

TITLE: Inelastic scattering of 6.6-Mev protons from Ca^{40} and Mn^{55} nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42 no. 2, 1962, 395-402

TEXT: Inelastic proton scattering was studied with a rotating magnetic analyzer. The protons were accelerated in the 120-cm cyclotron of the Institute of Nuclear Physics of MGU [Assoc.]. The angular distributions were measured of elastically scattered protons or proton groups corresponding to the excited levels 3.352 ± 0.010, 3.733 ± 0.014 and 3.912 ± 0.015 Mev of Ca^{40}, and 0.131 ± 0.007, 0.994 ± 0.005, 1.291 ± 0.010, 1.523 ± 0.007 and 1.885 ± 0.007 Mev of Mn^{55}. The scattering mechanism is most probably a (p,n) reaction; its threshold is at [illegible] Mev for Ca^{40}, and 1.020 Mev for Mn^{55}. From the results shown in

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diagrams, it can be seen that all proton angular distributions are anisotropic and asymmetric with respect to the 90° angle, except for proton scattering from Mn^{55} when exciting the 1.523-Mev level. This distribution is isotropic according to the statistical theory. These results indicate that direct excitation is the main mechanism in inelastic proton scattering from Ca^{40} and Mn^{55}. This conclusion was verified by comparing the results with theoretical ones obtained with the model of direct interactions in inelastic scattering. Spin and parity of the levels considered were determined for some cases. For the 3.912-Mev level of Ca^{40}, 2^+ was obtained, and 3^- for the 3.735-Mev level, which gives the sequence 0^+, 3^-, 2^+ for the lowest Ca^{40} levels and agrees with the results of other authors. For the Mn^{55} levels 0.131, 0.984, 1.29[illegible] and [illegible].525 Mev, $(7/2)^-$, $(9/2)^-$, $(11/2)^-$, $(3/2)^-$ are obtained, respectively, and $(7/2)^-$ is most probable for the 1.685-Mev level. These characteristics show that collective and single-particle excited states exist in the Mn^{55} nucleus.

Yu. A. Vorob'yev, A. A. Danilov, Ye. F. Kir'yanov, V. P. Khrapov, Z. F. Kalacheva, M. Kh. Listov, R. I. Osipova, T. I. Dyukova and L. P. Kovaleva are thanked for help. A. K. Val'ter, I. I. Zalyubovskiy,

Card 2/3

Inelastic scattering of.

S/056/62/042/002/015/055
B102/B138

V. P. Lutsik (UFZh, 4, 705, 1959) and A. V. Luk'yanov, I. B. Teplov, M. K. Akimova (Tablitsa volnovykh kulonovskikh funktsiy - Tables of Coulomb wave functions - Izd. AN SSSR, 1961) are mentioned. There are 6 figures and 23 references: 8 Soviet and 15 non-Soviet. The four most recent references to English-language publications read as follows: A. M. Lane, E. D. Pendlebury, Nucl. Phys. 15, 39, 1960; G. E. Brown et al. Nucl. Phys. 24, 1, 1961; N. Nath et al. Nucl. Phys. 13, 74, 1959; E. Post, N. Austern, Phys. Rev. 120, 1375, 1960.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: August 31, 1961

Card 3/3

S/188/62/000/001/008/008
B145/B110

AUTHORS: Vasil'ev, S. S., Romanovskiy, Ye. A., Timushev, G. F.

TITLE: Absorption cross sections of Cu^{63} and Cu^{65} nuclei for 6.6-Mev protons

PERIODICAL: Moscow Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 1, 1962, 94 - 95

TEXT: Inelastic scattering of 6.6-Mev protons from Cu^{63} and Cu^{65} was studied, since contrary to $\sigma_{p,n}$ and $\sigma_{p,\alpha}$ the component $\sigma_{p,\gamma}$ of the absorption cross section (σ_r) has hardly been investigated. The measuring technique has been described previously (Trudy II Vsesoyuznoy konferentsii po yadernym reaktsiyam pri malykh i srednykh energiyakh (Proceedings of the Second All-Union Conference on Nuclear Reactions at Low and Medium Energies). M., 1960 (in print)). Results are listed in a table. Accuracy is 5 - 7 % for nonoverlapping peaks and about 15 % for overlapping peaks. The measured values show that inelastic scattering takes place via formation of a compound nucleus. The absolute partial cross sections were calculated by using

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data of Mazazi (Ref. 5, see below) on the relative intensities of inelastically scattered proton groups corresponding to the excitation of 46 Cu^{65} levels and 21 Cu^{65} levels (E_p = 6.51 Mev). The sums of the relevant partial cross sections are 240 ± 30 mb (Cu^{63}) and 70 ± 15 mb (Cu^{65}), and were set equal to $\sigma_{p,p'}$. The cross section $\sigma_{p,p'}$ of inelastic scattering via the compound nucleus formation was estimated on the basis of data on inelastic scattering with excitation of the first level: about 20 - 25 mb for Cu^{63}, and about 10 - 15 mb for Cu^{65}. From these results and from published data on $\sigma_{p,n}$ and $\sigma_{p,\alpha}$, σ_r was calculated to be 600 mb (Cu^{63}) and 617 mb (Cu^{65}). A comparison of these data with those obtained from the optical model can answer the question whether low-energy protons are absorbed by a thin surface layer or by the entire volume of the nucleus. A. P. Klyucharev is mentioned. There are 1 table and 7 references: 3 Soviet and 4 non-Soviet. The 3 references to English-language publications read as follows: Bjorklund F. E., Fernbach S., Phys. Rev., 10, 1295, 1958; Ref 5: Mazazi M., Buechner W., Figueiredo R. P., Phys. Rev., 108, 373, 1957; Benveniste J., Rooth R.

Card 2/3

Absorption cross sections... S/188/62/000/001/008/008
B145/B110

Mitchell A., Phys. Rev. 123, 1819, 1961.

ASSOCIATION: NIIYaF MGF

SUBMITTED: December 26, 1961

Table. Legend: (1) nucleus; (2) level, Mev; (3) differential inelastic scattering cross section, mb/steradian.

(1) Ядро	(2) Уровень в *мэв*	(3) Дифференциальное сечение неупругого рассеяния в *мб/стерад*							
		48°07	65°05	77°23	89°52	105°56	122°09	136°45	150°58
Cu^{63}	0,657±0,007	0,93	0,93	0,89	0,89	0,90	0,92	0,92	0,94
—»—	0,956±0,008	1,44	1,45	1,44	1,48	1,45	1,44	1,42	1,42
—»—	1,328±0,015	—	1,14	1,06	1,16	1,20	1,13	1,15	1,20
—»—	1,419±0,015	1,06	1,12	1,02	1,16	1,12	1,05	1,16	1,23
—»—	1,544±0,015	1,01	0,89	0,90	0,97	0,93	0,92	0,99	0,80
—»—	1,856±0,015	0,72	0,77	0,68	0,72	0,58	—	0,72	0,58
Cu^{65}	0,777±0,008	—	0,68	0,58	0,58	0,70	0,55	0,59	—
—»—	1,106±0,008	—	1,1	0,98	0,99	1,20	1,06	—	1,03

Card 3/3

GRANCHA, I.; ROMANOVSKIY, Ye.A., TIMUSHEV, G.F.

Measuring the polarization of 6.6 Mev. protons elastically scattered by Li^7. Vest. Mosk. un. Ser. 3: Fiz., astron. 19 no.3:100 My-Je '64. (MIRA 17:11)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo universiteta.

SHAKHRAY, F.V.; PARASHCHENKO, G.,red.; TIMUSHEV, S., otv. za vypusk; TSIVUNIN, I., tekhn.red.

[Ways of developir ; wood chemistry in the Komi A.S.S.R.] Puti sozdaniia lesokhimii v Komi ASSR. Syktyvkar, Komi knizhnoe izd-vo, 1959. 21 p. (MIRA 13:6)

1. Chlen nauchno-tekhnicheskogo obshchestva lesnoy promyshlennosti (for Shakhray).
(Komi A.S.S.R.--Wood--Chemistry)

LUBNIN, Aleksandr Il'ich, inzh.; LIBERMAN, Semen Abramovich, inzh.; SKAZHENIK, Georgiy Dmitriyevich, inzh.; MILLER, Viktor Yakovlevich, inzh.; PETRAKOV, Andrey Ivanovich, inzh.; USHAKOV, Nikolay Alekseyevich, kand. tekhn. nauk; VAD'YAYEV, Gavriil Mikhaylovich, inzh.; TIMYANSKIY, Samuil Yakovlevich, arkh.; KIKIN, A.I., doktor tekhn. nauk, prof., red.; BEGAK, B.A., red.; SHERSTNEVA, N.V., tekhn. red.

[Designing buildings and structures for metallurgical plants] Proektirovanie zdanii i sooruzhenii metallurgicheskikh zavodov [By] A.I.Lubnin i dr. Moskva, Gosstroiizdat, 1963. 321 p. (MIRA 17:2)

1. Gosudarstvennyy institut proyektirovaniya metallurgicheskikh zavodov (for Timyanskiy). 2. Gosudarstvennyy institut po proyektirovaniyu, issledovaniyu i ispytaniyu stal'nykh konstruktsiy i mostov (for Petrakov). 3. TSentral'nyy nauchno-issledovatel'skiy i proyektno-eksperimental'nyy institut promyshlennykh zdaniy i sooruzheniy (for Ushakov).

L 22348-66 EWT(d)/EWT(m)/EWP(w)/EWP(c)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(l)/
ACC NR: AP6012744 ETC(m)-6 IJP(c) JD/HW SOURCE CODE: UR/0122/66/000/004/0042/0043

AUTHOR: Tin Ten-Yur (Candidate of technical sciences, Docent); Zol'nikov, N. G. (Engineer) 51

ORG: none B

TITLE: Surface hardening metals by hydraulic pulses

SOURCE: Vestnik mashinostroyeniya, no. 4, 1966, 42-43

TOPIC TAGS: surface hardening, steel surface hardening, hydraulic bombardment

ABSTRACT: The possibility of surface hardening metals by hydraulic pulses has been tested with specimens of annealed of hardened and tempered steels 2, 3, 20, 45, 65G, U8, U8A, U10, 40 Kh, ShKh15, 5KhNM, 30KhGSNA, and 30KhGSA of various shapes and thicknesses. The specimens were bombarded with water-jet pulses varying in intensity and diameter at a water pressure of 5000 to 18,000 atm. The surface hardness of all the specimens tested increased by 11 to 20% for hardened and tempered specimens, and by 15 to 25% for annealed specimens. Only 5KhNM and 30KhGSA steel specimens had a less pronounced hardness: 8.1 to 8.2%. The surface quality of the specimens was better than in the case of shot pinning.* [AZ]

SUB CODE: 13/ SUBM DATE: none/ ORIG REF: 006/ ATD PRESS: 4242

* Probably shot peening

Card 1/1 dda UDC: 621.789

FEDOROV, Konstantin Ivanovich; TINCHEROVA, Z., red.; SALAKHUTDINOVA, A., tekhn.red.

[Work brings fame] Mekhnat shon-sharaf keltirdi. Toshkent, Uzbekiston SSR davlat nashriëti, 1960. 35 p. (MIRA 14:3)

(Uzbekistan--Textile workers)

KOSTERIN, V.A.; TINCHURIN, F.Z.

Gas-turbine system for air blowing into a blast furnace. Trudy KAI no.70:87-96 '62. (MIRA 18:4)

TINCHURIN, F.Z.

Cementation with casinghead gas from the oil fields of the Tatar A.S.S.R. Trudy KAI no.70:124-130 '62.

(MIRA 18:4)

TINCHURINA, S.G., mladshiy nauchnyy sotrudnik (Kazan', ul. Zhukovskogo d.28, kv.2)

Effect of cortisone and deoxycorticosterone on the healing of experimental fractures. Ortop., travm. i protez. 25 no.5:52 My '64. (MIRA 18:4)

1. Iz Kazanskogo instituta travmatologii i ortopedii (dir. - starshiy nauchnyy sotrudnik U.Ya.Bogdanovich).

TINCU, A.

TINCU, A. Repairs of good quality ensure increased production. p. 2.

Vol. 9, no. 367, Jan. 1957.
CONSTRUCTORUL
TECHNOLOGY
RUMANIA

So: East European Accession, Vol. 6, No. 5, May 1957

TINCU, A.

SURNAME (in caps); Given Names

Country: Rumania

Academic Degrees:

Affiliation: "N. Balcescu" Agronomic Institute (Institutul Agronomic "N. Balcescu"), Bucharest.

Source: Bucharest, Probleme Zootehnice si Veterinare, Vol XI, No 10, Oct 1961, pp 17-26.

Data: "Studies for the Determination of Mixed Concentrates Used in the Feeding of Chicks for Broilers."

Authors:

BAIA, Gh., -Prof. Dr.-
MARTIN, V., -Veterinarian.-
BUNICELU, E., -Engineer.-
TEODORESCU, S., -Engineer.-
TINCU, A., -Technician.-
ZAHARIA, M., -Chemist.-

TINCU, I.

Support to the trade-union enterprises so they can fulfill their engagements. Munca sindic 6 no.8:34-37 Ag '62.

1. Membru in biroul executiv al Consiliului Regional al sindicatelor, Brasov.

TINCU, Ion

Multilateral support to the trade unions in the new product enterprises. Munca sindic 7 no.3:9-12 Mr '63.

1. Membru in birous executiv al Consiliului regional al sindicatelor, Brasov.

AMBRUS, T.; TINCU, L.; VELNICERIU, A.; GAVAT, Lucia

Contributions to the synthesis of the Captan fungicide. Note II.
Rev chimie Min petr 13 no.5:275-278 My '62.

STANCIU,L., dr.; BRANEA,I., dr.; TINCU, Lia, dr.; MIHAILOV,Ileana, dr.

Problems caused by some localizations and electrical abnormalities of myocardial infarct. Med. intern. (Bucur.) 17 no.1:101-107 Ja '65

1. Lucrare efectuata in Serviciul de cardiologie, Clinica medicala, Timisoara.

AMBRUS, Tamara; TINCU, Lucia; MARCULESCU, Cristineta; BARBULESCU, N.

Some aspects of the synthesis of N-methylamide of the O,O-dimethyldithiophosphorylacetic acid. Rev chimie Min petr 15 no. 7:386-389 Jl '64

1. Chemical Research Institute, Ministry of Petroleum and Chemical Industry.

VELNICERIU, A.; GAVAT, Lucia; TINCU, Lucia

On the stability of some substituted s-triazines, used as herbicides. Rev. chimie Min petr 13 no.9:513-516 S '62.

TEODORESCU, P.; STEFAN, I.; LILIS, M.; SIRBULESCU, R.; CONSTANTINESCU, P.; TINCU, S.

The adrenal glands & cardiac failure: functional tests & therapeutic attempts. Rumanian M. Rev. 3 no.1:15-21 Jan-Mar 59.

(CONGESTIVE HEART FAILURE
adrenal cortex funct. & prednisone ther.)
(ADRENAL CORTEX, physiol.
in congestive heart failure, application to prednisone ther.)
(PREDNISONE, ther. use
congestive heart failure, indic. by adrenal cortex funct.)

TEODORESCU, P., prof.; STEFAN, I.; LILIS, M.; SIRBULESCU, R.; TINCU, S.; POMPILIAN, P.

Contributions to the functional characterization of the adrenal cortex in heart failure. Rumanian M Rev. no.1:272 Ja-Mr '61.

1. Medical Clinic, Cataruzino Hospital, Medicopharmaceutical Institute, Bucharest. Head of the Clinic: Prof. P. Teodorescu.
(ADRENAL CORTEX physiology) (HEART FAILURE, CONGESTIVE physiology)

DIMITRIU, Victor, Conf.; TINCU, S., dr.; POPA, M., dr.; STEFAN, I., dr.; IDU, S., dr.

Cardiac insufficiency; relation to metabolism of electrolytes and water. Med. int., Bucur. 8 no.3:391-395 July 56.

1. Lucrare efectuata in Clinica medicala I.P.S.M.F. Spitalul "Coltea."

(CONGESTIVE HEART FAILURE, metabolism
electrolytes & water)
(BODY FLUIDS
water-electrolyte balance disord. in congestive heart failure.)

TEODORESCU, P., prof.; LILIS, M., dr.; STEFAN, I., dr.; TINCU, Silvia, chemist; SIRBULESCU, R., dr.; POMPILIAN, P., dr.; CUCU, N., dr.; STERIAN, Iolanda

Treatment with sulfonamide diuretics in refractory cardiac insufficiency. Med. intern., Bucur 13 no.1:121-135 Ja '61.

(HEART FAILURE, CONGESTIVE therapy)
(CHLOROTHIAZIDE related cpds)

TEODORESCU, P., prof.; SIRBULESCU, R., dr.; POMPILIAN, P., dr.; DEGERATU, T., dr.; TINCU, S., chim.

Treatment with guanethidine in severe forms of hypertensive disease. Med inter 15 no. 5:613-617 My '63.

1. Lucrare efectuata in Clinica a III-a medicala, Spitalul "Bernat Andrei" I.M.F., Bucuresti.
(HYPERTENSION) (GUANETHIDINE)

TEODORESCU, P., prof.; SAVULESCU, V., dr.; ANDRONACHE, I., dr.; STEFAN, I., dr.; GANCEVICI, A., dr.; TINCU, S., chem.; STANCESCU, Smaranda, dr.

Adrenocortical physiopathological correlations in the pre-ulcerous stage of peptic ulcer. Med. intern. (Bucur.) 17 no.9:1069-1076 S '65.

1. Lucrare efectuata in clinicele medicale de la Spitalul Raionului "T. Vladimirescu" si de la Spitalul "Brincovenesc", Institutul medico-farmaceutic, Bucuresti.

SUSHIN, Vasiliy Yefimovich; KVASHENKO, Yuriy Kirillovich; DUDIN, Semen Ivanovich; ANDRONOVA, Lyubov' Nikanorovna; PETLAKH, Abram Smerkovich ; GRIGOR'YEV, Vasiliy Nikolayevich; KOLYCHEVA, Nataliya Ivanovna; CHUGREYEVA, V.N., red.; TINDE, N.F., red.; BATYREVA, G.G., tekhn. red.; VINOGRADOVA, G.A., tekhn. red.

[Manual on auxiliary equipment and supplies for the textile industry] Spravochnik po vspomogatel'nym izdeliam dlia tekstil'noi promyshlennosti. Pod red. V.E.Sushina i N.F.Tinde. Moskva, Rostekhizdat, 1963. 432 p. (MIRA 16:5)
(Textile industry--Equipment and supplies)

TINDECHE, S.

On-the-spot heating of petroleum by-products. p. 7. TEHNICA NOUA. (Asociatia Stiintifica a Inginerilor si Tehnicienilor) Bucuresti. Vol. 3, No. 40, Mar. 1956.

So. East European Accessions List Vol. 5, No. 9 September, 1956

TINDECHE, S., ing.

Establishing the daily crude oil production. Petrol si gaze 15 no.3: 111-116 Mr '64.

Tindeche, S.

TINDECHE, S.

TINDECHE, S. Modern methods for pumping crude oil and petroleum products. p. 200.

Vol. 7, no. 4, Apr. 1956
PETROL SI GAZE.
TECHNOLOGY
RUMANIA

So: East European Accession, Vol. 6, No. 5, May 1957

TINDECHE, S., ing.

Economic methods for crude oil treatment. Petrol si gaze 14 no.10:500-502 0'63.

TINDECHE, S., ing.

Technical progress in crude oil transportation in Rumania.
Petrol si gaze 14 no.8:398-401 Ag '63.

TINDITNIK, V.S.; STR[illegible]OVA, O.G.; PREOBRA[illegible]HENSKAYA, Yu.N.

Effectiveness of [illegible] treatment in [illegible] poisoning by mercury chlorides. Trudy [illegible] No. [illegible] 5 no.[illegible] '62. (MIRA 18:6)

TINDITNIK, V.S.

Gastrointestinal blood circulation in hypertension. Trudy Inst. im. N.V. Sklif. 5 no.2:50-54 '62. (MIRA 18:6)

TINDITNIK, V. S. Cand Med Sci -- (diss) "Tissue therapy in the case of hypertonic disease according to Academician V. P. Filatov." Omsk, 1955. 10 pp 22 cm. (Omsk Med Inst im M. I. Kalinin), 100 copies

(KL, 7-57, 110)

81

TINDITNIK, V. S.

USSR/Medicine - Antibiotics Feb 51

"Therapeutic Properties of the Tea Fungus," V. S. Tinditnik, S. Ye. Funk, I. V. Sabinskaya Therapeutic Dept, Omsk Clinical Hosp for Water Transport Workers of the Lower Irtysh Basin

"Terap Arkhiv" Vol XXIII, No 1, pp 85-87

Extract of this fungus, used as popular medicine and beverage, was found to have bactericidal effect on streptococci and diplococci. It cured acute tonsillitis (Vincent's angina, lacunary, follicular, and catharral), chronic enterocolitis of gastrogenic origin, and small suppurating wounds of fingers and toes.

177T67

VASIL'YEV, B.N.; VORON'KO, Yu.K.; MANDEL'SHTAM, S.L.; TINDO, I.P.; SHURYGIN, A.I.

Preliminary results of studying the roentgen radiation from the sun by means of rockets and spaceships. Dokl. AN SSSR 140 no.5:1058-1061 O '61. (MIRA 15:2)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR. Predstavleno akademikom D.V.Skobel'tsynym.
(Solar radiation)
(Spaceships)

TINDO, I. P.

MANDEL'SHTAM, S.L.; TINDO, I.P.

Additional data on the photoelectric investigation of spark channel spectra. Izv. AN SSSR. Ser. fiz. 19 no.1:60-61 Ja-F '55. (MLRA 8:9)

1. Fizicheskiy institut imeni P.N. Lebedeva Akademii nauk SSSR
(Spectrum analysis) (Spectrometer)

MOISEYEVA, K.A.; PENKINA, N.V.; TINDO, I.P.

Photoelectric attachement to the ISP-22 spectrograph and its use for aluminum alloy analysis. Zav. lab. 23 no.5:625-627 '57.
(Spectrograph--Attachments) (MLRA 10:8)
(Photoelectric measurements)

TINDO, I.P.

29(2) PHASE I BOOK EXPLOITATION SOV/3234

Zhdanov, Georgiy Borisovich, and Igor' Pavlovich Tindo

Laboratorii v kosmose (Laboratories in Space) [Moscow] Izd-vo TsK VLKSM "Molodaya gvardiya," 1960. 191 p. 150,000 copies printed.

Ed.: G. Aydinov; Tech. Ed.: L. Murlykova.

PURPOSE: The book is intended for the general reader interested in space exploration.

COVERAGE: The book reports on some of the major findings made with the help of artificial earth satellites. It discusses the radiation zone surrounding the Earth and evaluates other dangers to be considered in a man-in-space project. Vertical temperature distribution is also discussed. The book emphasizes Soviet contributions to the study of outer space. No personalities are mentioned. No references are given.

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Laboratories in Space (Cont.) SOV/3234

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AVAILABLE: Library of Congress

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S/025/60/000/011/006/008
A166/A026

24,2120 (1155, 1160, 1482)

AUTHOR: Tindo, I.P.

TITLE: Astronomy of the Far Ultraviolet

PERIODICAL: Nauka i zhizn', 1960, No. 11, pp. 41 - 45

TEXT: The article deals with astronomy based on ultraviolet, gamma- and hard radiation. The Soviet scientist B.A. Severnyy is of the opinion that solar flares are due to the "pinch" effect, such as was reproduced by Academician I.V. Kurchatov in his controlled thermo-nuclear reaction experiments. Attempts made by the American G. Friedman to study the short-wave radiation of large "hot" heavenly bodies in the ultraviolet band at 1,2116 Å proved inconclusive due to light-scattering. I.S. Shklovskiy has advanced the hypothesis that the light-scattering was caused by the "geocorona" of hydrogen around the earth, the existence of which was later confirmed by direct measurement of the hydrogen concentration by rocket-borne proton traps. Later research in the 1,225 - 1,350 Å band has revealed the existence of 7 ultraviolet nebulae, only two of which had previously been recorded (in the Orion and Kiel constellations). The first attempt to analyse the processes behind the purely ultraviolet nebulae was made by

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Astronomy of the Far Ultraviolet

I.S. Shklovskiy, S.B. Pikel'ner and G.S. Ivanov-Kholodnyy. In the 1930's, A.Ya. Kipper advanced the hypothesis that, with ultra-high rarefaction of the gas, some of the atoms in the nebulae might develop a transition of electrons from one orbit to another, accompanied by emission of two quanta. This would lead to a constant radiation band with its maximum intensity at 2,432 Å and with the increased brightness extending into the shortwave band as far as 1,216 Å. Assuming that this hypothesis was correct, Shklovskiy's team calculated that the ultraviolet radiation of the nebulae must be accompanied by visible radiation of an intensity detectable by modern telescopes, but no such radiation has been detected. After further research, Shklovskiy, therefore, concluded that the shortwave radiation must be caused by collision of rapid corpuscles with the atoms of the gas nebulae, which would give a radiation at 1,216 Å, shifted slightly towards the long or short waves depending on whether the particles were moving away from or towards the sun. Since gamma-rays are propagated strictly rectilinearily, it is theoretically possible to determine their source. The first research into gamma-ray astronomy was made by S.N. Vernov and A.Ye. Chudakov in 1946, using a "telescope" of counters in an "anticoincidence" circuit. The device recorded only those particles or quanta which activated the central counter without evoking an impulse in the side counters. The method is unfortunately unsuitable for satel-

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88095
S/025/60/000/011/006/008
A166/A026

Astronomy of the Far Ultraviolet

lites which mostly move in the earth's radiation belts, littered with protons, electrons, etc. There are 4 figures.

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3.2430(1482,2806)

S/560/61/000/010/002/016
D299/D302

172450

AUTHORS: Mandel'shtam, S. L., Tindo, I. P., Voron'ko, Yu. K., Shurygin, A. I., and Vasil'yev, B. N.

TITLE: Study of solar X-radiation. I. Geophysical-rocket measurements

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no. 10. Moscow, 1961, 12-21

TEXT: This is the first of 3 investigations on X-radiation in the range below 10 Å carried out by research rockets and the 2nd and 3rd Sputniks. Provisional results of these measurements were set forth in brief in an earlier study. Experimental method: The measurements described in the present article were carried out during the flight of 2 research rockets. The prime object of the measurements was to accumulate experimental data and to develop a method for subsequent measurements by means of

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3394

S/560/61/000/010/002/016
D299/D302

Study of solar...

earth-satellites. As detectors, photon counters were used, as these are more sensitive in the spectral range < 10 Å than vacuum photomultipliers. The sensor unit was placed on the instrument container which turned automatically towards the sun. Special precautions were taken to ensure that no corpuscular radiation should interfere with the measurements. In the first launching, the sensor unit incorporated 2 similar counters directed towards the sun; one of the counters had a magnetic shield, and the other had none. In the second launching, both counters had magnetic shields, but the second counter was at an angle of 15° towards the sun, recording non-solar radiation only. Standard counters of type СБТ-9 (SBT-9) were used. The characteristics of the counters are described. The counting rate was calculated from the telemetered data. The 2 rockets were launched on July 21, 1959, in the morning and evening respectively. On that day, the solar activity was intense. Results: A figure shows the dependence of the counting rate on altitude.

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Study of solar...

A considerable X-ray flow was recorded from altitudes of 95 km up. Owing to the stability of orientation of the container with respect to the sun, it was unnecessary to make allowance for the angular dependence of counter efficiency. From the counting-rate data, the energy distribution and the magnitude of the energy flux outside the atmosphere were calculated. The data processing was based on the expression $m_{incl} = m_{vert} \Phi(z)$, where m_{incl} is the mass of an inclined air-column of 1 cm^2 cross-section lying between the apparatus and the sun, m_{vert} -- the mass of a vertical column equal to the atmospheric pressure at the given altitude, and $\Phi(z)$ is determined by the zenith angle of the sun z. A figure shows the counting rate as a function of m_{incl}. Assuming the spectral region under investigation to be continuous, it is possible to construct the photon-distribution curve by means of the counting-rate curves, the mass

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33304

S/560/61/000/010/002/016
D299/D302

Study of solar...

coefficients of absorption of air, and the spectral-sensitivity curve of the counters. A figure shows the photon-distribution curves as a function of wavelength. The energy distribution in the morning and evening launchings was found to differ by a factor of 3. It is difficult to ascertain whether this difference is real. The main source for the continuous radiation is electron bremsstrahlung in the field of hydrogen and helium ions. The obtained electron temperature considerably exceeded the value of $T_e \sim 1 \div 3 \times 10^6$ °K obtained in subsequent investigations by space-ships. A comparison of measurements conducted by Friedman (in 1953) during a minimum-period of solar activity with the authors' measurements (in December 1960, by space-ship) after a maximum-phase showed that the temperature and intensity of radiation are greatly dependent on the phase of the sun cycle. As the above-described rocket investigations were carried out for very low positions of the sun above the horizon (in contra-

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Study of solar...

distinction to Friedman's investigations), further systematic measurements are required. In ensuing articles, the results of measurements carried out on the 2nd and 3rd Sputniks will be given, as well as a description of the electronic equipment. There are 11 figures and 20 references: 8 Soviet-bloc and 12 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: G. Elwert, J. Geophys. Res., 66, 391, 1961; H. Friedman, Trans. Intern. Astr. Un., 10, 706, 1960, Cambridge Univ. Press; T. A. Chubb, H. Friedman, R. W. Kreplin, J. Geophys. Res., 65, 1831, 1960; R. W. Champion, R. A. Minzner, Plan. and Space Science, 1, 259, 1959.

SUBMITTED: May 17, 1961

Card 5/5

3.2420 (1049, 1482)

29115
S/020/61/140/005/011/022
B104/B102

AUTHORS: Vasil'yev, B. N., Voron'ko, Yu. K., Mandel'shtam, S. L., Tindo, I. P., and Shurygin, A. I.

TITLE: Preliminary results of a study of solar x-radiation by means of rockets and space ships

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 5, 1961, 1058-1061

TEXT: By means of two geophysical rockets (July 21, 1959, altitude 105 km), the second space ship (August 19-20, 1960, altitude of perihelion 305 km, aphelion 320 km), and the third space ship (December 1-2, 1960, perihelion 180 km, aphelion 249 km), solar radiation in the spectral range below 10 Å was studied. End-window photon counters with aluminum coated (2μ) mica windows (1.6 mg/cm^2, d = 4 mm) were attached outside the apparatus container which left the rocket and turned automatically to the sun. By means of magnetic systems, the windows of counters were shielded from 15-20 kev electrons which might cause bremsstrahlung. At an altitude of 95 km, the counting rate of counters oriented toward the sun increased. This radiation was considered to be

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Preliminary results of a. .

an x-radiation. Using data of V. V. Mikhnevich et al. (Izv. AN SSSR ser. geofiz., no. 11, 1393 (1957)) results of measurement were extrapolated for the boundary of atmosphere. Radiation fluxes (2.0 Å) obtained were $7.3 \cdot 10^{-4}$ and $3.2 \cdot 10^{-4}$ erg/cm^2·sec. On the second space ship, six end-window photon counters with beryllium windows (0.1 mm thick, 7 mm in diameter) were used. Counters were arranged vertical to each other. The counting rate amounted to some thousand pulses/sec when the counters were exposed to solar radiation. On that part of the orbit which was in the earth's shadow it was some ten pulses/sec (cosmic background), and reached high values only when the orbit approached the outer radiation belt. From the results of measurements in the shadow region, the authors concluded that a radiation from the radiation belt did not occur below 30-40° north and 20-30° south. A radiation flux of $7.6 \cdot 10^{-4}$ erg/cm^2·sec was obtained. On the third space ship, two counters with mica windows (1.6 mg/cm^2, d = 4 mm) covered on both sides with aluminum foils (5μ) were switched in parallel. These two counters were oriented toward the sun. Two other counters of the same type were arranged vertical to the former. Tantalum plates were located in front

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Preliminary results of a...

of the windows of these control counters. They recorded radiation caused by slowing down electrons in the tantalum plates. In the instrument container two other beryllium window counters were installed. Thus, it was possible to separate the background of x-radiation caused by electrons from the solar x-radiation. An x-radiation flux of $2.4 \cdot 10^{-4}$ erg/cm^2·sec was obtained in the range 2-10 Å. The electron temperature of solar radiation in the spectral range investigated was estimated to be $\sim 2 \cdot 10^6$. I. S. Shklovskiy (Izv. Krymsk. astrofiz. obs., 4, 80 (1949)), T. V. Kazachevskaya and G. S. Ivanov-Kholodnyy (Astr. zhurn., 36, 1022 (1959)), S. N. Vernov and A. Ye. Chudakov (Usp. fiz. nauk, 70, no. 4, 585 (1960)), and L. V. Kurnosova et al. (Sborn. Iskusstvennyye sputniki Zemli no. 10 (1961)) are mentioned. There are 4 figures and 7 references: 5 Soviet and 2 non-Soviet. The three most recent references to English-language publications read as follows: T. A. Chubb, H. Friedman, R. W. Kreplin, J. Geophys. Res., 65, no. 6, 1831 (1960); H. Friedman, Astronautics, no. 11, 42, 128 (1960); J. A. Van Allen, L. A. Frank, Nature, 183, 430 (1959).

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29115
S/020/61/140/005/011/022
B104/B102

Preliminary results of a...

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

PRESENTED: May 24, 1961, by D. V. Skobel'tsyn, Academician

SUBMITTED: April 19, 1961

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Card 4/4

37195

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3.2100

S/560/61/000/011/001/012
E032/E514

AUTHORS: Mandel'shtam, S.L., Tindo, I.P., Voron'ko, Yu.K., Vasil'yev, B.N. and Shurygin, A.I.

TITLE: Studies of solar X-ray emission. II

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no.11. Moscow, 1961. Rezul'taty nauchnykh issledovaniy, provedennykh vo vremya poletov vtorogo i tret'yego kosmicheskikh korabley-sputnikov, 3-14

TEXT: In a previous paper (Ref.1: Iskusstvennyye sputniki Zemli, no.10, Izd-vo AN SSSR, 1961, p.12) the authors reported measurements of the intensity of solar X-ray emission below 10 Å which were carried out with the aid of geophysical rockets. In the present paper they report the corresponding results obtained with the second and third Soviet spaceships on August 19-20 and December 1-2, 1960. The aim of the measurements was to investigate the intensity over an extended period of time (of the order of a day or two). Preliminary results have been given by the authors in another paper (Ref.2: Dokl. AN SSSR, 140, 1058, 1961). The second spaceship carried six end-window photon counters (15 mg/cm^2 beryllium foils) with an oxygen-neon quenching mixture.

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* S/560/61/000/010/002/016

Studies of solar X-ray emission.II S/560/61/000/011/001/012
E032/E514

These counters were developed under the direction of I. A. Prager and S. M. Perel'man. The counters had a sensitivity of between 0.1 and 0.2 pulses/photon in the wavelength range 3-7.5 Å. The counters were mounted so that their axes were oriented along six directions at equal angles to each other; the field of view of each counter was 45°. The telemetric record showing the counting rate as a function of time is reproduced. It is estimated that the flux of radiation in the range 2-10 Å, which was recorded during the flare of August 19 (15 hr 33 min) was of the order of $7 \cdot 10^{-3} - 1.5 \cdot 10^{-2}$ erg cm^{-2} sec^{-1}. The apparatus mounted on the third spaceship was somewhat modified. Three types of probes were employed so that the solar radiation below 10 Å could be continuously monitoredtogether with interference due to radiation-belt particles. The main detectors were two parallel-connected СБТ-9 (SBT-9) counters with mica windows (1.6 mg cm^{-2}) and located in a lead screen 1 mm thick. The counters were supplied by solar batteries. In addition, there were two "control counters" which were mounted at right angles to the direction of the sun. A tantalum plate was placed in front of the counter

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windows and served as a target for the radiation-belt particles. The counters were practically insensitive to solar X-ray radiation. A third pair of counters was mounted on the outer surface of the third spaceship. These counters were similar to those carried by the second spaceship. The aim was to estimate the spectral energy distribution by comparing the indications of the beryllium and the mica counters. The telemetric record obtained with the aid of the third spaceship is reproduced. It is estimated that the flux of radiation below 10 Å was $2.5 \cdot 10^{-4}$ erg cm^{-2} sec^{-1}. Moreover, the intensity of radiation in this spectral region remained constant within $\pm$20% during the observations. This was due to the fact that on December 1-2, 1960 the sun was very quiet and there was only one flare (importance 1^+). The question of the flux and the energy of the particles recorded in these experiments is being examined at the present time. There are 10 figures and 2 tables.

SUBMITTED: June 26, 1961

Card 3/3

MANDELSHTAM, S. L., TINDO, I. P., VORON'KO, Yu. K., VASILYEV, B. N., and SHURYGIN, A. I.

"The Intensity of The X-ray Radiation of The Sun Near The Short-Wave Edge of The Spectrum"

report presented at the 13th Intl. Astronautical Federation Congress, (FAI) Varna, Bulgaria, 23-29 Sep 1962

TINDO, K.P.

MANDELSHTAM, S. L., VASILYEV, B. N., VORONKO, Yu. K., TINDO, K. P., SHURYGIN, A.

"Measurements of Solar X-ray Radiation"

Soviet Papers Presented at Plenary Meetings of Committee on Space Research (COSPAR) and Third International Space Symposium, Washington, D. C., 23 Apr - 9 May 62

S/026/62/000/007/005/005
D050/D113

3,2100

AUTHOR: Tindo, I.P.

TITLE: Solar X-ray emission

PERIODICAL: Priroda, no. 7, 1962, 37-47

TEXT: This is a popular review on the quantitative measurement of solar x-ray and ultraviolet short-wave radiation. A description of the commonly used spectrographic accessories, filters, etc., is given, including the basic and control meters on the 3rd sputnik, the recordings of which are shown in a diagram. Information is presented on x-ray investigations at the edge of the earth's atmosphere, radiation of the quiet sun, and x-ray flares. Finally, the author supposes that the discoveries of Soviet and foreign astrophysicists, of designers of rocket and space vehicle instrumentation, and of ionosphere researchers will soon lead to the discovery of the nature of solar x-ray radiation. There are 15 figures.

ASSOCIATION: Fizicheskiy institut im. P.N. Lebedeva AN SSSR (Physics Institute im. P.N. Lebedev of the AS USSR), Moscow

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S/020/62/142/001/015/021
B104/B102

AUTHORS: Mandel'shtam, S. L., Voron'ko, Yu. K., Tindo, I. P., Shurygin, A. I., and Vasil'yev, B. N.

TITLE: Study of solar X-ray emission during the total solar eclipse on February 15, 1961

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 1, 1962, 77-80

TEXT: The shortwave range (< 10 Å) of the solar spectrum was examined with photon counters described in previous papers of the authors (DAN, 140, no. 5, 1058 (1961); Sborn. Iskusstvennyye sputniki Zemli, (a) no. 10, 1961, p. 13; (b) no. 11, 1961, p. 3). A. P. Lukirskiy helped in determining the spectral sensitivity of the apparatus at the Leningradskiy gosudarstvennyy universitet (Leningrad State University), using a method of Lukirskiy, M. A. Rumsh, and L. A. Smirnov (Optika i spektroskopiya, 9, 505 (1960)). The counters had been developed under the supervision of I. A. Prager and S. M. Perel'man. The counter block was mounted on the outside of the instrument container of a geophysical rocket. The counters always faced the Sun. The container reached an altitude of about 96 km. The emission

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Study of solar X-ray emission ...

of the solar corona is continuous in the spectral region in question and has no intense lines. The energy distribution of solar emission and the energy flux in the spectral range under consideration were determined from the variations of the count rate with altitude, with the spectral sensitivity of the counters, and with the mass absorption coefficient of air (Fig. 3). The emission of the totally covered corona in the spectral range in question had an intensity of $4 \cdot 10^{-4}$ erg/cm^2·sec. The shortwave part of the solar spectrum is emitted from all those parts of the corona, in which the 5303 Å line is also excited. There are 4 figures, 1 table, and 7 references: 4 Soviet and 3 non-Soviet. The two references to English-language publications read as follows: G. Elwert, J. Atm. Terr. Phys., 12, 187 (1958); J. Geophys. Res., 66, 391 (1961).

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

PRESENTED: July 4, 1961, by A. A. Blagonravov, Academician

SUBMITTED: June 27, 1961

Card 2/

L 38561-65 FSS-2/EWT(l)/EEC(m)/EWG(v)/FCC/EEC-4/EEC(t)/EWA(h) Po-4/Pe-5/
Pq-4/Pae-2/Peb/Pi-4 GW-2
ACCESSION NR: AP5009645 UR/0293/65/003/002/0262/0267

63
B

AUTHOR: Tindo, I. P.; Shurygin, A. I.

TITLE: Investigation of solar x-radiation. IV. Measurements of radiation flux in the spectral range 2—18 A

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 2, 1965, 262-267

TOPIC TAGS: solar radiation, Geiger photon counter, impulse speed, rocket trajectory, control counter, x radiation, recombination energy flux, color temperature, electron temperature

ABSTRACT: Solar radiation has been measured on rockets at a height of 500 km by means of Geiger photon counters and a control counter. A special device was used to record the impulse speed. The aperture of one Geiger counter was covered with beryllium film and that of the other counter with aluminum film. A control counter with an aluminum aperture was also covered with gold and silver films. At the top of the rocket trajectory the control counter recorded 4.5 impulses per second and the aluminum and beryllium counters 4.5 and 8 impulses per second, respectively. Photon counters were mounted on the container and pointed toward the sun. The x-radiation in the range from 2—18 A was caused by recombination of heavy ions.

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L 38561-65

ACCESSION NR: AP5009645

Numerical values obtained by counters and computed energy flux for color and electron temperatures are given in a table in the original article. Orig. art. has: 2 tables and 7 figures. [EG]

ASSOCIATION: none

SUBMITTED: 16May64	ENCL: 00	SUB CODE: AA, NP
NO REF SOV: 004	OTHER: 001	ATD PRESS: 3225

Card 2/2